Matching Waveform Audio Files with Toxicall Data: Record Linkage in a Poison Control Center

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Abstract:

Analysis of coded communications and electronic patient record data present a unique opportunity for nursing knowledge discovery, the integration of communication content with clinical data. However, joint analysis of coded communications and clinical data depends on the ability to link waveform audio files with patient records. A procedure has been developed to /ink waveform audio files with Toxicall patient records, using date/time stamps and station identification numbers.

Keywords: Medical Record Linkage, Communication, Poison Control Centers, Data Analysis

Article:

Problem

Information on the outcomes of patients who refuse further medical evaluation for potentially toxic exposures is scarce. However, failure to respond to poison control recommendations may result in patient harm and increased health care costs. Data mining methods may be used to gain insight into patient adherence to health care facility referrals. Though patient-provider communication undoubtedly influences patient adherence, it is not captured in the patient record. Communications may be represented as coded data using Roter Interaction Analysis System. However, joint analysis of coded communication and patient record data first requires linkage between an audio recording and the relevant patient record. In a poison control center using the call recording system, NICE, and the Toxicall patient record system, linkage is currently a manual process, requiring human selection of the relevant audio content using a web-based interface, followed by conversion to digital waveform audio file. For a pilot sample of eighty records, manual linkage required thirty-one hours of labor. Clearly, manual linkage is cumbersome and time- consuming, and inappropriate for large-scale joint analysis of audio recordings and patient record data.

Methods

N=1000 Toxicall patient records, representing instances of patient referral to a health care facility, will be randomly sampled from the Toxicall databases. Record linkage, association of a single patient record with a discrete waveform audio file. will consist of multiple steps. In the first step, software will be applied to extract and convert one or more waveform audio file(s,)

approximately matching the date/ time stamp of a given Toxicall patient record. Then, audio files and patient records will be matched on criteria that include: date, time, channel name, and station. Results of the record linkage will be reported in percentages of unique linkages, multiple linkages, and non-linkages.

Conclusion

Joint analysis of coded patient-provider communication with patient record data depends upon an accurate procedure for record linkage. For files that are not prospectively linked, record linkage procedures must be used to match communication codes with patient records. This study will assess the quality and performance of such a linkage procedure.